Claims:

1. A method for quantitating or detecting the presence of a target compound in a sample which may contain the target compound, comprising:

(a) exposing a sample which may contain the target compound to a capture molecule or target molecule binding fragment thereof capable of binding to the target molecule under conditions suitable to form a capture molecule:target molecule complex;

(b) adding to the capture molecule:target molecule complex, a nucleic acid moiety containing detector molecule capable of binding to the target molecule to form a capture molecule:target molecule:detector molecule complex;

(c) amplifying the nucleic acid moiety by PCR amplification; and

(d) quantitating or detecting the PCR amplified nucleic acid moiety using a detectable non-primer probe capable of binding to the nucleic acid moiety.

2. The method of Claim 1, further comprising washing the capture molecule:target molecule complex to remove unbound sample after step (a).

3. The method of Claim 2, further comprising washing the capture molecule:target molecule:detector molecule complex to remove unbound detector molecule after step (b).

4. The method of Claim 1, wherein the capture ~~molecule~~ antibody is bound to a solid support or carrier during step (a) or (b).

5. The method of Claim 1, wherein the capture ~~molecule~~ antibody is in solution during step (a) or (b).

6. The method of Claim 1, wherein the capture molecule is an aptamer.

7. The method of Claim 1, wherein the capture molecule is a DNA labeled antibody.

8. The method of Claim 1, wherein the target molecule is an organic compound having a molecular weight of about 100 to about 1000 grams/mole.

9. The method of Claim 1, wherein the target molecule is a protein or fragment thereof.

protein

10. The method of Claim 9, wherein the ~~target molecule~~ is a cytokine selected from the group consisting of growth hormone, insulin-like growth factors, human growth hormone, N-methionyl human growth hormone, bovine growth hormone, parathyroid hormone, thyroxine, insulin, proinsulin, relaxin, prorelaxin, glycoprotein hormones, follicle stimulating hormone (FSH), thyroid stimulating hormone (TSH), leutinizing hormone (LH), hematopoietic growth factor, vesicular endothelial growth factor (VEGF), hepatic growth factor, fibroblast growth factor, prolactin, placental lactogen, tumor necrosis factor-alpha, tumor necrosis factor-beta, mullerian-inhibiting substance, mouse gonadotropin-associated peptide, inhibin, activin, vascular endothelial growth factor, integrin, nerve growth factors (NGFs), NGF-beta, platelet-growth factor, transforming growth factors (TGFs), TGF-alpha, TGF-beta, insulin-like growth factor-I, insulin-like growth factor-II, erythropoietin (EPO), osteoinductive factors, interferons, interferon-alpha, interferon -beta, interferon-gamma, colony stimulating factors (CSFs), macrophage-CSF (M-CSF), granulocyte-macrophage-CSF (GM-CSF), granulocyte-CSF (G-CSF), thrombopoietin (TPO), interleukins (ILs), IL-1, IL-1alpha, IL-2, IL-3, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-11, IL-12, LIF, SCF, neurturin (NTN) and kit-ligand (KL).

11. The method of Claim 1, wherein the sample is selected from the group consisting of blood, serum, sputum, urine, semen, cerebrospinal fluid, bronchial aspirate and organ tissue.

12. The method of Claim 5, wherein the capture ~~molecule~~ antibody is labeled with biotin and is bound to a streptavidin or avidin labeled support.

13. The method of Claim 1, wherein the detectable non-primer probe comprises a nucleic acid having a fluorescent dye label.

14. The method of Claim 13, wherein the fluorescent dye label comprises two dyes, a reporter dye and a quencher dye, which fluoresce at different wavelengths.

15. The method of Claim ~~7 which can quantitate~~ 1, wherein the target molecule is quantitated at a concentration of $\leq 10^{-12}$ grams/ml.

16. The method of Claim 1, ~~which can detect~~ wherein the target molecule is detected at a concentration of about 1.0 x 10^{-8} to about 1.0 x 10^{-15} grams/mL.

17. The method of Claim 1, wherein the nucleic acid detector molecule is RNA and the RNA detector molecule is reverse transcribed to form DNA before or during amplifying step c).

18. The method of Claim 17, wherein the RNA detector molecule is reverse transcribed at a temperature sufficient to dissociate the detector molecule from the capture molecule:target molecule:detector molecule complex and reverse transcribe the RNA.

19. The method of Claim 18, wherein the temperature is about 50C to about 70C.

20. The method of Claim 4, wherein the solid support is a PCR tube.

~~21. The method of Claim 1, comprising quantitating the PCR amplified nucleic acid moiety using real time PCR during PCR amplification in step (d).~~

22. A method for quantitating or detecting the presence of a target compound in a sample which may contain the target compound, comprising:

(a) exposing a sample which may contain the target compound to a capture antibody or target molecule binding fragment thereof capable of binding to the target molecule under conditions suitable to form a capture antibody:target molecule complex;

(b) adding to the capture antibody:target molecule complex, a biotinylated nucleic acid moiety containing detector molecule capable of binding to the target molecule to form a biotinylated capture antibody:target molecule:detector molecule ternary complex in solution;

(c) immobilizing the biotinylated ternary complex to a streptavidin coated PCR tube;

(d) amplifying the nucleic acid moiety by PCR amplification; and

(e) quantitating or detecting the PCR amplified nucleic acid moiety using a detectable non-primer probe capable of binding to the nucleic acid moiety and real time PCR during PCR amplification.

23. A method for quantitating or detecting the presence of a target compound in a sample which may contain the target compound, comprising:

(a) exposing a sample which may contain the target compound to a capture antibody or target molecule binding fragment thereof capable of binding to the target molecule under conditions suitable to form a capture antibody:target molecule complex;

(b) adding to the capture antibody:target molecule complex, an RNA or DNA aptamer detector molecule capable of binding to the target molecule to form a capture antibody:target molecule:aptamer ternary complex;

(c) when the aptamer is an RNA detector molecule, reverse transcribing the RNA to DNA;

(d) amplifying the DNA aptamer or DNA obtained by step (c) by PCR amplification; and

(e) quantitating or detecting the PCR amplified DNA using a detectable non-primer probe capable of binding to the DNA and real time PCR during PCR amplification.

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